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CONSUMPTION HABITS AND PRODUCTION PROGRAMS\*

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In developing either short-time or long-time plans for production control programs in agriculture, consideration necessarily has to be given to a large number of factors. High in importance among these factors is, first, the problem of determining the volume of production needed. Before we can gauge what adjustments are desirable in our present agricultural production and our need for farm land, obviously we first must determine which of our products are now produced in superfluity or deficiency; in short, we must set up goals toward which we should aim.

In determining this desirable volume of production, the objective should be to maintain our present and prospective population on a level of consumption for food products adequate, at least, for good health and nutrition, and so to distribute and control this production as to result in a standard of living for the farm population comparable to that enjoyed by other groups. To the production required for domestic purposes must be added the volume of production which we shall be able to sell abroad at remunerative prices. We shall also need to give consideration to the kinds and quantities of farm products we shall take from abroad as imports. Account, likewise, must be taken of trends in consumption under way, of possible future changes in dietary habits, the effect of varying levels of business activity and consumer purchasing power upon consumption, and of national economic policy upon international trade.

For purposes of the present discussion, our concern is with consumption and consumption habits, as they are or may be related to production programs. Now, in determining this relationship and the resulting need for farm land, as disclosed thereby, we can proceed either from actual or assumed situations. We may base our calculations, for example, upon the average level of consumption we actually have experienced, say for the past 10 years; or if certain clearly defined trends are in evidence, upon a level of consumption as indicated by the actual trends under way; or, on the other hand, we may take the level of consumption experienced during prosperous periods in the past as our goal; or we may take the findings of the nutrition specialists and take a level of consumption which will result in a better-balanced nutrition than any that the great mass of consumers has yet experienced.

\*An address before the Farm Family Living Section of the National Outlook Conference, Washington, D.C., October 30, 1934.

Obviously, the particular level of consumption taken as a point of departure will determine not only the total land required but also the particular use of that land for the production of the different products. Unless our forecasts are to go sadly awry, we shall need to be pretty sure of our ground when projecting from given or assumed situations or from assumed trends under way. We may as well recognize, however, that consumption figures available for many of our farm products are, at best, only approximate. We know at the outset, therefore, that any final acreage figure derived will be proximate, since it will include such errors as exist in the original data. Furthermore, it should be recognized that changes in dietary habits usually come slowly, depending, in part upon shifts in the age composition of the population, in part upon education, in part upon shifts in the intensity of labor, income levels, purchasing power, and the like. Likewise, the consumption of all farm products is more stable than the consumption of particular commodities or of groups of commodities; hence, upward trends in any one commodity or in any one group may be offset by a downward trend in some other which is competing for the consumer's purchasing power.

With a view of determining just what effect different levels of consumption have upon the total land requirements for food products, the Production Planning Section of the Agricultural Adjustment Administration has undertaken, during the past few months, a number of calculations. The results of these calculations are shown in the table appearing on page 3.

For purposes of comparison we have taken, first, our crop acreage actually harvested for food and the number of livestock on hand or slaughtered during the 5-year period, 1928-32. It should be noted that the data in the first column are for domestic production only, whether disposed of at home or abroad; whereas those in the other columns are for total domestic consumption, whether produced domestically or imported. We then calculated the per capita consumption of the various farm products by years from 1920 to date, and determined what the average level of consumption had been for three selected periods. One of these periods extends over the 10-year period from 1921 to 1930. Although at the beginning of this period we were emerging from a major business depression and at the end were going into one, for the period as a whole, general business conditions and the purchasing power of consumers were on a reasonably high level.

The second level of consumption used covers the period from 1925 to 1929. During this period, as is well known, business activity was at a rather high level; the amount of unemployment was low and the income of consumers was probably equal to, or higher than, the income in any other similar peace-time period in our recent history. The third level of consumption used covers the period from 1931 to 1933. During this period the great depression reached its most acute stage; business activity was at a low level; unemployment was very high; and income of consumers, as a group, was at an extremely low level. We thus obtained a range in conditions varying from normal or moderate prosperity to an extreme of high prosperity on the one hand, and to one of deep depression on the other. Such a set-up should throw some light upon what happens to our consumption during periods of varying business activity and the relation it has to total land requirements.

Over against these actual levels of consumption we have placed the recommended diets worked out by Dr. Hazel K. Stiebeling and Miss Modera M. Ward (Dept. Circ. 296). These four diets, with which I assume you are familiar, are scientifically balanced but are at different levels of nutritive content and cost. The first diet is a restricted diet for emergency

Comparison of actual acreages and livestock production with acreage and production required to support 125 million people at varying consumption and diet levels

Item	5-year average 1928- 32	Varying levels of consumption			Varying diet levels			
		1921- 30	1925- 29	1931- 33	Emergency	Min- imum cost	Mod- erate cost	Liberal cost
Harvested food crops...	307	284	284	280	160	221	276	329
Feed grains.....	157	144	143	140	63	104	133	180
Hay.....	64	70	69	61	32	52	81	96
Wheat.....	60	43	44	51	43	42	34	26
Potatoes.....	4	4	4	4	4	4	4	4
Sugar crops.....	1	6	5	5	3	2	3	3
Truck crops.....	3	3	4	4	2	3	5	7
All fruits.....	5	5	5	5	3	5	10	11
Beef cattle.....	12.2	14.3	14.4	12.4	2.5	5.1	9.9	16.1
Veal calves.....	8.6	9.5	9.5	8.8	2.7	4.0	8.1	14.8
Hogs.....	69.3	63.7	62.4	63.4	22.3	44.7	52.1	84.9
Sheep and lambs.....	20.3	17.8	17.6	22.4	3.3	5.7	16.6	29.9
Dairy cattle.....	23.1	23.8	23.4	24.4	16.4	26.3	40.8	40.8
Poultry.....	458.8	458.9	462.5	457.8	167.4	313.7	313.7	627.3

use. This diet provides about 2,675 calories per capita per day and is made up largely of the cheaper foods, such as wheat flour, corn meal, and other cereals, dried beans and peas, with reduced quantities of fresh fruits and vegetables, milk, and dairy products. As suggested by the name, the quantities of food allowed are close to the minimum and are not recommended for use over extended periods.

The next two diets are the adequate diet at minimum cost and the adequate diet at moderate cost. These two diets provide about 3,000 calories per day and have a vitamin content of 50 to 100 percent greater than the restricted diet. They also provide for a much smaller consumption of cereal products and a corresponding increase in the consumption of dairy products, vegetables, and lean meat. As indicated by the name, the adequate diet at moderate cost is further removed from the restricted diet than the adequate diet at minimum cost. It provides for a more liberal consumption of milk, meat, and certain of the vegetables and fruits.

The fourth diet, which is termed a liberal diet, provides about the same number of calories as the two adequate diets. It, however, provides for an even smaller use of cereal products and an increased, very liberal use of lean meat, eggs, milk, tomatoes, vegetables, and fruits.

Perhaps it will be helpful in visualizing the difference between these diets at different nutritive levels and cost, and the various levels of consumption, if we translate them into terms of per capita consumption. (See table on page 5.)

The per capita data from which these calculations were developed for the diets are the same as those reported in table 5 of Circular 296, by Dr. Stiebeling and Miss Ward, with the exception of the itemized distribution of all the group totals which were originally bracketed and the redistribution of the total lean meat between beef, pork, lamb and mutton, and veal. All distributions and changes were approved by Dr. Stiebeling.

The acreage calculations are based on 10-year average yields throughout, and the totals for each level of consumption and for each diet are the computed amounts required to support a 125-million population. Allowance has been made for conversion and other wastes between the farm and kitchen throughout, in order that a comparison, exact as possible, may be made between them. The acreages shown also include the area necessary to grow the feed for sustaining the work stock required for producing the crops.

With this rather lengthy explanation of the different consumption and diet levels and the bases used in the calculations, we are now ready to consider what the results show.

Considering, first, the total harvested food-crop acreage required to supply a population of 125 million people at the calculated levels of consumption for the three periods, it will be observed that there is a remarkable uniformity in the total acreages: being 284 million for the 10- and 5-year periods and dropping only to 280 million acres during the depression period. This tends to bear out the observation that the trend in consumption for all agricultural products has been practically constant for the periods under consideration. It should not be inferred from this, however,

Approximate yearly quantities per capita at varying consumption and diet levels

Item	Unit	At level of consumption in--			At level of diet			
		1921-30	1925-29	1931-33	Restricted for Emergency use	Adequate at Minimum cost	Adequate at Moderate cost	Liberal
Wheat flour.....	lbs.	177	179	173	168	157	122	76
Other cereals.....	"	51	50	47	72	67	38	24
Whole milk.....	qts.	153	156	162	78	130	296	296
Evaporated milk...	lbs.	15	15	16	83	138	10	10
Butter.....	"	18	18	18	10	15	35	35
Margarine.....	"	2	2	2	16	3	1	1
Potatoes.....	"	170	166	155	165	165	165	155
Dried beans, peas, nuts.....	"	15	15	16	30	30	20	7
Citrus fruits.....	"	28	30	37	25	25	45	55
Leafy, green, or yellow vegetables:	"	60	64	63	40	80	100	135
Other vegetables and fruits.....	"	250	260	246	75	130	280	400
Beef (lean meat)...	"	58	57	49	9	18	35	57
Pork (lean meat)...	"	49	49	49	15	30	35	57
Lard.....	"	14	14	15	6	12	7	7
Salt pork and bacon	"	21	21	21	6	12	2	2
Vegetable oils and shortenings.....	"	9	10	10	7	7	7	7
Lamb and mutton...	"	6	6	7	1	2	5	9
Veal.....	"	8	8	7	2	3	6	11
Poultry.....	"	14	14	13	3	7	11	18
Eggs.....	no.	246	253	256	96	180	180	360
Sugar.....	lbs.	109	116	108	50	35	60	60

that the per capita consumption of each individual commodity has been constant. In fact, there has been considerable fluctuation. The consumption of pork and lard, for example, increased rapidly from 1921 to 1924, declined from 1924 to 1926, went forward again in 1927-28 and since that time has remained constant but at a higher level than at the beginning of the period. These fluctuations in the consumption of pork products have been offset, in large part, by what has happened to beef and veal. The consumption of these latter products has tended to fluctuate inversely with pork and its products. Dairy products have fluctuated somewhat but, on the whole, have been fairly constant throughout the period. Sugar products, however, increased almost 20 percent from 1920 to 1925, remained fairly constant at that level until 1929, since which time they have declined slightly but still are well above the level of 1920. The consumption of corn as food, on the other hand, has tended to decline. The decline started

in 1912, dropped precipitately until 1921, since which time it has been fairly constant.

In interpreting these data it should be observed that much greater reliance can be placed upon some of them than on others. Probably neither the milk nor the meat figures are as reliable as are those for certain of the other products. When we consider the acreage requirements for the different crops, it will be noted that the decreased acreage of feed grains and hay, required to supply the food products consumed during the 1931-33 depression level, is practically offset by the increased wheat acreage. During this latter period, you will recall, we were building up our huge wheat stocks with a resulting decline of wheat prices to feed-price levels. This resulted in an increase of wheat used for feed, from a normal amount of 30 to 50 million bushels to 125 million bushels or more during the thirties.

The acreage required to supply our consumption of potatoes and sweet-potatoes, truck and fruit crops, remained about the same. The larger acreage of sugar crops for the 10-year period is to be explained by the rapid increase in consumption for the first half of the period, from 1920 to 1925. The apparent decreased slaughter requirements for beef cattle and veal calves during the 1931-33 period are probably overstated, in that the new revisions in the slaughter figures now under way will pull the totals shown down, possibly as much as one million head. The increased slaughter requirements of sheep and lambs, however, are probably in line with upward trends in consumption under way.

Turning, now, to the acreage required to supply the food products called for under the different diet levels, we get the expected increase in total acreage as we go from the restricted or emergency diet to the liberal diet. This results, of course, from the increasing proportion of derivative products relative to directly consumed products in the latter diets. Although the acreage requirements vary from 160 million acres for the restricted diet to 221 and 276 for the two adequate diets respectively, and to 329 for the liberal diet, it is interesting to observe how closely the acreage required for the adequate diet at moderate cost compares with the acreage required under the different levels of consumption. In fact, the total of 276 million acres required for this diet is somewhat less than that for any of the three periods taken. In terms of acreage required per capita the comparison is as follows:

	<u>Acres per capita</u>
1921-30 level of consumption.....	2.27
1925-29 level of consumption.....	2.27
1931-33 level of consumption.....	2.24
Liberal diet.....	2.63
Moderate diet.....	2.20
Minimum diet.....	1.77
Restricted diet.....	1.28

Although the total as well as the per capita acreage for the adequate diet at moderate cost is very similar to that required under the actual levels of consumption, the distribution of the acreage of the different crops and classes of livestock is quite different. Whereas the acreage in

feed grains and hay taken together is very similar for the moderate diet and the different consumption levels, the proportion of hay to grain is greater in the case of the diet. This results because of the larger number of dairy cows required to supply the milk and milk products called for by the diet and the smaller number of hogs necessary to supply the pork products. Similarly, the acreage in fruits and vegetables increases because of the more liberal consumption of these products. On the other hand, the acreage in wheat necessarily is smaller for the reason of the declining relative significance of cereal products in the suggested diet.

If the comparison be made between the consumption levels and the liberal diet, the differences are even more striking. Because of the more generous consumption of meat, poultry, fruits, and vegetables, and even less dependence upon cereals, the total food crop acreage required increases materially.

If we accept the results as shown, as being substantially correct, what conclusions may we draw from them and what implications do they have for long-time planning and adjustment programs? The uniformity in the results for the different levels of consumption suggest that the quantities of food products, as a whole, consumed per capita do not fluctuate a great deal from periods of high industrial activity to periods of moderate or depressed business conditions. It would appear then, that it would require from 280 to 285 million acres of crop land to supply our present population with the food products they consume. If we add to this another 25 to 30 million acres, needed to supply the non-food products, we obtain a total of 305 to 315 million acres for domestic food and non-food requirements. If we then accept our five-year average (1928-32) crop acreage of 360 to 370 million acres to be a reasonable measure of our effective crop area, we have a difference of 50 to 55 million acres. We shall either have to ship the products of these acres abroad or permit them to pile up again in excess stocks or else we shall have to permit the land to remain idle.

In the prosperous period from 1925 to 1929, when our population was about 5 percent smaller than at present, we actually exported the products of 60 to 70 million acres. This acreage fell to 40 or 50 million during the depression period, 1931-33. Just what it will be in 1934-35 and the next few years ahead, of course, is problematic. The prospects are that it may be as low as 30 to 40 million acres for the next year or two. If this is true, then we apparently have an excess of 15 to 25 million acres, for the products of which we have no prospective market. It should be observed, however, that we probably could sell more products abroad if we were satisfied to accept a low price for them. Our exports during 1931-33 were as high as they were because we exported a large amount of very cheap cotton, which certainly was not profitable to cotton growers.

If we take a longer point of view and allow for an increasing population, we shall probably need all of this crop area, for which there is no immediate prospective market, and some in addition if we increase our exports above the present level. If we assume that, roughly, 2.25 acres are required per capita to supply our domestic food requirements, and that our population will reach a maximum of around 140 million by 1960, then we

would need an additional 30 to 35 million acres for food products alone. In terms of totals this would increase our food crop acreage, at average yields, from 280 to 310 or 315 million acres. To this, of course, would have to be added the acreage required for non-food crops. If our per capita consumption of these products remained at present levels, the increased population would result in an increase of from 3 to 5 million acres in these crops, bringing the total crop acreage for domestic purposes up to 335 to 345 million acres. From this total we would have to subtract approximately 10 million acres to allow for normal imports of such products as sugar and flaxseed, so that a net requirement of 325 to 335 million acres would remain. If we continued to export cotton and other products then, at about the same level as now, which is questionable, we would need, 25 years hence, a total harvested crop area of 360 to 370 million acres as compared with 360 to 370 million acres now.

If we move in the direction of the adequate diet at moderate cost, as suggested by Dr. Stiebeling, and I think all will agree that this diet will give us a better balanced nutrition, it will be necessary to make some rather pronounced shifts in our types of farming, also we probably would have to step up our average family income. It would involve, in the first place, a decrease in our total feed grain and small grain acreages and an increase in hay and pasture crops. This would result in an extensification of our agriculture. Such a directional change would be in line with the generally accepted opinion, that we should decrease our grain crops and increase hay and pasture, to minimize the serious problems of erosion and fertility depletion.

Geographically, such a shift would necessitate decreasing feed grain crops in the Corn Belt, minimizing the production of meat animals, and increasing materially the number of dairy cows and the production of milk and its products. It would mean the decrease of our present wheat area almost 50 percent and the finding of profitable alternative uses to which the land could be put. It would also mean a rather material expansion in our present fruit and vegetable area, and a decrease in our sugar crops, or else less dependence upon foreign sources for our supply.

Still greater shifts in production would result if we were to go all the way to the level of consumption called for in the liberal diet. It would mean a step-up of 25 to 30 percent in our feed grain acreage over present acreage requirements, 35 percent or more in our hay acreage, 100 percent in our fruit and vegetable acreage, and a decrease of 60 percent in our wheat acreage. On the other hand, it would involve an increase of 70 to 75 percent in our dairy cow population, 35 percent in beef cattle, and a like increase in hogs, approximately 50 percent in sheep and lambs, and 35 to 40 percent in poultry. Furthermore, to produce the lean meat called for by the liberal diet, would result in an excess of close to 4 billion pounds of salt pork, bacon, and lard, which would have to be disposed of in some way. In terms of total acreage it would mean we would either have to expand our present crop area, or cease exporting agricultural products entirely.

Now, what are the probabilities that we could make such a pronounced shift, and what are the conditions with respect to changes in farming systems,

dietary habits, and consumer purchasing power that would be necessary. Obviously, it would result in very marked geographic shifts in our agriculture. If we were forced to pull out of the export market on cotton, for example, we would have to reduce our cotton acreage more than 50 percent and utilize the land for other purposes. Because of the small quantity of wheat products in the liberal diet, we likewise would have to shift 60 percent of our present wheat area into other uses, and change the proportions of feed, hay, and small grain crops in other regions materially from those now followed. These changes would have repercussions upon farming practices, labor distributions, relative costs, and the like.

The materially higher cost of such a diet would be an even more difficult obstacle to hurdle. It has been estimated that in 1929 probably 20 to 25 percent of the families in the United States were on a liberal diet, or probably it would be more accurate to say that this proportion of the population had incomes high enough to permit them to enjoy such a diet. Dr. Stiebeling estimates that families with incomes around \$3,000 or above can afford the liberal diet.

To get the other 75 to 80 percent of the population upon the same consumption level, it would be necessary for them somehow or in some way to move themselves into this higher income classification. It then would be necessary to educate them or convince them that the liberal diet was more desirable than the other things they might spend their money for. For these families to lift themselves into this higher income group, it would be necessary for 75 to 80 percent of them, even under the prosperous conditions of 1929, practically to double their income. That such a shift can be made, of course, is extremely improbable. Even if it were possible to overcome the income hurdle, the problem of making such an abrupt shift in dietary habits alone would be a difficult one.

All these difficulties have been appreciated and recognized by Dr. Stiebeling and Miss Ward, but some others who have discussed the problem have not been so careful in their deductions. In fact, it illustrates the difficulties so many people fall into when they attempt to generalize from a specific situation.

The liberal diet is now within the reach of a large number of our families (possibly 20 percent), who for one cause or another, may not be consuming in a manner to result in a balanced nutrition. It was the objective of Dr. Stiebeling and Miss Ward, as I understand it, to indicate to such groups how they might make a better selection of foods, and at the same time not have to spend more money than they probably now spend, rather than to imply that the entire population could adopt such a diet.

That it is highly desirable to get as large a proportion of our families on a balanced nutrition as soon as possible, is evident. Even though the liberal diet is ideal for the whole population and was suggested as such, a combination of the two adequate diets at minimum and moderate costs is not an unrealizable goal to aim at.

Although in 1929 almost 60 percent of our families had incomes of \$2,000 or less, about two thirds of whom could have afforded the adequate diet at minimum cost, it would have been necessary for the great bulk of them to have stepped up their incomes considerably, possibly to the \$1,800-\$3,000 level, as estimated by Dr. Stiebeling, to afford the adequate diet at moderate cost. Hence some combination or average of the two probably would be a more practicable and realizable goal at which to aim than either taken separately. If through better management of our economic affairs and by proper education we can get the American people to move in that direction, we will have accomplished a great deal.

For purposes of planning programs for the present or immediate future, however, reliance probably will have to be placed pretty much upon actual consumption figures. Because of the slowness with which food-consumption habits usually change, very wide variations from actual situations are likely to lead to erroneous results. For longer-range planning, on the other hand, there is more time for working out desired results or for influencing consumption trends by educational and other means; hence, the goal may be one that diverges materially from the present situation.